



Lab. Tech : K. Ford
Date Completed : 10/25/13
Boring : S0069R

Notes:

Enginnering Materials Laboratory
4539 N. Brawley #108, Fresno, CA 93722
559-276-9311

MOISTURE & DENSITY TEST

Client : URS/ARUP/HMM JV

Project : California High Speed Train

ISI Lab No.: G-52923

Job no : 2636-001.0

Boring #	S0029R	S0029R	S0030R	S0033AR	S0069AR	S0069AR	S0069AR	S0069R
Sample #	MC09-2	U10	MC10-3	SS16	U11	MC16-1	MC18-1	MC02-2
Depth (ft.)	41.0-41.5	42.0-44.5	42.0-42.5	50.0-51.5	42.0-44.5	65.0-66.5	75.0-76.5	5.5-6.0
Soil type: (visual)	Grayish brown silty clay	Olive brown sandy silt	Greenish gray clayey sand	Grayish brown silt with sand (BAGGIE COULD NOT DO MD)	Olive brown sandy clay	Olive gray sandy clay	Olive brown silty clay	Grayish green clay with sand
1. Date tested:	01/17/14	01/17/14	01/17/14	01/15/14	01/17/14	01/17/14	01/17/14	01/17/14
2. Tested by:	JH	JH	JH	JH	JH	JH	JH	JH
3. Specimen height (in.)	5.96	3.93	5.90		3.96	6.00	6.00	5.95
4. Wt. of specimen + tare (gm)	900.72	868.95	815.58		880.48	951.22	956.29	897.34
5. Tare wt. (gm)	0.00	0.00	0.00		0.00	0.00	0.00	0.00
6. Diameter (in.)	2.41	2.85	2.37		2.87	2.42	2.42	2.41
7. Wet wt. of soil + dish wt. (gm)	276.47	264.91	298.04	98.44	273.64	275.82	301.24	293.74
8. Dry wt. of soil + dish wt. (gm)	229.46	229.54	247.22	90.20	239.02	239.79	257.94	255.15
9. Wt. of dish (gm)	50.59	50.41	50.06	50.96	51.20	50.87	50.41	50.89
10. Dish ID								
Wet Density (pcf)	126.1	131.9	119.3		130.8	131.2	131.9	125.8
Dry Density (pcf)	99.9	110.2	94.8		110.5	110.2	109.1	105.8
Moisture Content (%)	26.3	19.7	25.8	21.0	18.4	19.1	20.9	18.9
Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.687	0.529	0.777		0.525	0.529	0.544	0.592
Saturation (%)	103.3	100.7	89.6		94.8	97.3	103.6	86.2
Additional data:								
Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								



*Construction Testing & Inspection * Geotechnical & Environmental Engineering*

Sieve Analysis for Soil and Fine Aggregate

Project:	CA HSR FRE_BAK	Technician:	K. Ford
TES#:	23502-ZS9	Date:	10/16/2013
Boring No.:	S0069R	Sample No.:	B01
		Remarks:	(SM) Silty Sand

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	74.1	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	74.1	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	49.6	2"	44.0 (20.0)

Sieve Size	Individual Weight Retained	Individual % Retained	Combined % Retained	Combined % Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.9	1.2	1.2	98.8	
#10	0.4	0.5	1.8	98.2	
#16	0.2	0.3	2.0	92.0	
#30	11.9	16.1	18.1	82.2	
#40	5.2	7.0	25.1	75.3	
#50	6.9	9.3	34.4	66.1	
#100	13.3	18.0	52.4	48.5	
#200	11.3	15.3	67.6	33.5	
Pan					

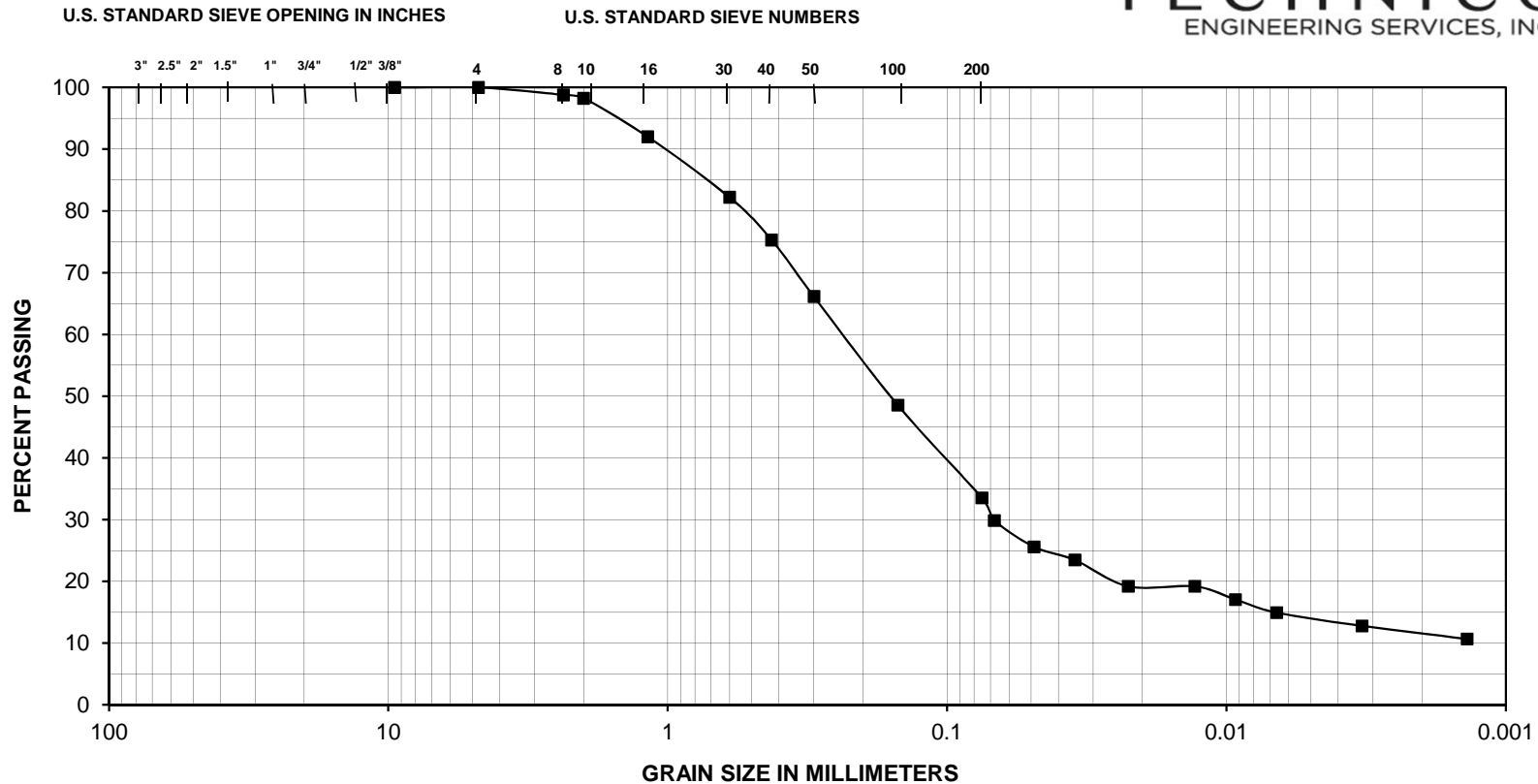


Construction Testing & Inspection * Geotechnical & Environmental Engineering

HYDROMETER TEST DATA SUMMARY

ASTM D 422-63

PROJECT: CA HSR FRE_BAK		TES #: 23502-ZS9					
Boring Number S0069R		DATE: 10/16/2013					
Sample Depth, ft	0.0-5.0'	Sample No.: B01	TESTED BY: K. Ford				
Mass of Test Sample, g	75.00	"air-dried"	Hydrometer Type 151H				
Mass of Hygroscopic Sample, g	12.02	"air-dried"					
Mass of Hygroscopic Sample, g	11.87	"oven-dried"	Specific Gravity of Test Material 2.650				
Mass of Test Sample, g	74.06	"oven-dried"	Specific Gravity of Test Solution Varies				
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)
0.5	1.016	1.014	21	12.6	0.01348	0.0677	30.4
1	1.014	1.012	21	13.1	0.01348	0.0488	26.1
2	1.013	1.011	21	13.4	0.01348	0.0349	23.9
5	1.011	1.009	21	13.9	0.01348	0.0225	19.5
15	1.011	1.009	21	13.9	0.01348	0.0130	19.5
30	1.010	1.008	21	14.2	0.01348	0.0093	17.4
60	1.009	1.007	21	14.4	0.01348	0.0066	15.2
250	1.008	1.006	21	14.7	0.01348	0.0033	13.0
1440	1.007	1.005	21	15.0	0.01348	0.0014	10.9
4140	1.006	1.004	21	15.2	0.01348	0.0008	8.7



Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	CA HSR FRE_BAK
B01	(SM) Silty Sand	0	67.6	20.6	11.8	1.3					
										TES#:	23502-ZS9
										Boring#:	S0069R
										Date:	10/16/2013

* Particles smaller than 5 Micron in diameter

Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	10/3/2013
TES#:	23502-ZS9	Sample No.:	SS03
Boring #:	S0069R; 11.0-11.5'	Classification:	(ML) Sandy Silt

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	234.8	1/2"	4.0 (2.0)
Initial Weight Fine Aggregate Before Wash	234.8	3/4"	11.0 (5.0)
		1"	22.0 (10.0)
Final Weight Fine Aggregate After Wash	109.4	1 1/2"	33.0 (15.0)
		2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	5.3	0.0	2.3	97.7	
#8	7.8	2.5	3.3	96.7	
#16	10.1	2.3	4.3	95.7	
#30	12.8	2.7	5.5	94.5	
#50	23.1	10.3	9.8	90.2	
#100	63.3	40.2	27.0	73.0	
#200	104.1	40.8	44.3	55.7	
Pan	109.4				



Construction Testing & Inspection * Geotechnical & Environmental Engineering

Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
TES#:	23502-ZS9	Date:	10/3/2013
Boring #:	S0069R; 36.0-36.5'	Sample No.:	SS08
		Classification:	SM Silty Sand

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	250.9	1/2"	4.0 (2.0)
Initial Weight Fine Aggregate Before Wash	250.9	3/4"	11.0 (5.0)
		1"	22.0 (10.0)
Final Weight Fine Aggregate After Wash	162.5	1 1/2"	33.0 (15.0)
		2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	2.7	0.0	1.1	98.9	
#8	3.0	0.3	1.2	98.8	
#16	10.4	7.4	4.1	95.9	
#30	43.2	32.8	17.2	82.8	
#50	74.0	30.8	29.5	70.5	
#100	111.4	37.4	44.4	55.6	
#200	156.1	44.7	62.2	37.8	
Pan	162.5				



*Construction Testing & Inspection * Geotechnical & Environmental Engineering*

Sieve Analysis for Soil and Fine Aggregate

Project:	CA HSR FRE_BAK	Technician:	K. Ford
		Date:	10/16/2013
TES#:	23502-ZS9	Sample No.:	SS14
Boring No.:	S0069R	Remarks:	(SM) Silty Sand

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	98.2	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	98.2	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	56.8	2"	44.0 (20.0)

Sieve Size	Individual Weight Retained	Individual % Retained	Combined % Retained	Combined % Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.2	0.2	0.2	99.8	
#10	0.2	0.2	0.4	99.6	
#16	0.2	0.2	0.6	98.0	
#30	9.2	9.4	10.0	90.1	
#40	7.4	7.5	17.5	82.6	
#50	10.8	11.0	28.5	71.6	
#100	17.4	17.7	46.2	54.0	
#200	11.1	11.3	57.5	42.7	
Pan					

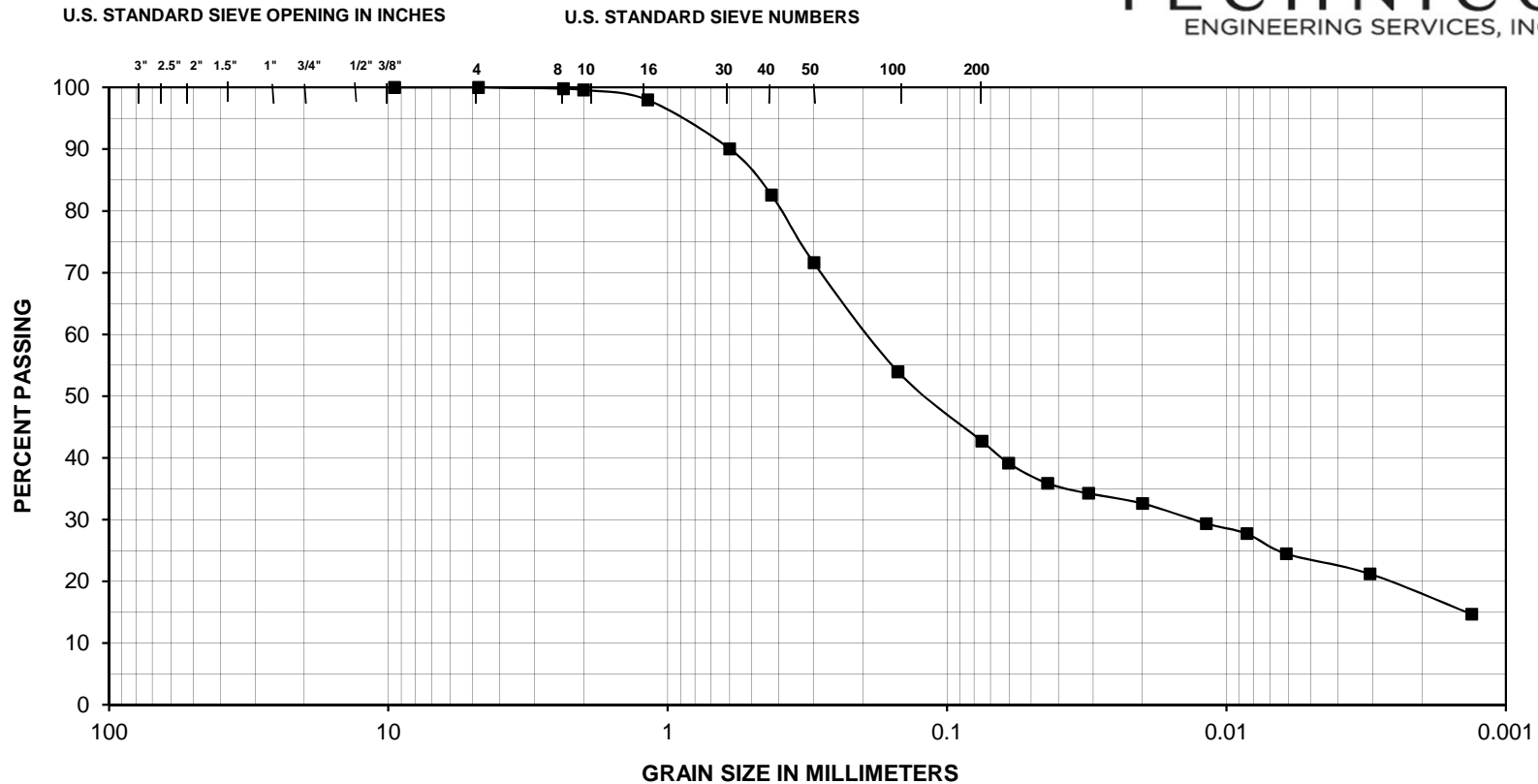


Construction Testing & Inspection * Geotechnical & Environmental Engineering

HYDROMETER TEST DATA SUMMARY

ASTM D 422-63

PROJECT:		CA HSR FRE_BAK				TES #: 23502-ZS9	
Boring Number		S0069R				DATE: 10/16/2013	
Sample Depth, ft		66.0'-66.5'		Sample No.: SS14		TESTED BY: K. Ford	
Mass of Test Sample, g		100.00	"air-dried"	Hydrometer Type		151H	
Mass of Hygroscopic Sample, g		15.01	"air-dried"				
Mass of Hygroscopic Sample, g		14.74	"oven-dried"	Specific Gravity of Test Material		2.650	
Mass of Test Sample, g		98.20	"oven-dried"	Specific Gravity of Test Solution		Varies	
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)
0.5	1.026	1.024	21	10.0	0.01348	0.0603	39.3
1	1.024	1.022	21	10.5	0.01348	0.0437	36.0
2	1.023	1.021	21	10.7	0.01348	0.0312	34.4
5	1.022	1.020	21	11.0	0.01348	0.0200	32.7
15	1.020	1.018	21	11.5	0.01348	0.0118	29.5
30	1.019	1.017	21	11.8	0.01348	0.0085	27.8
60	1.017	1.015	21	12.3	0.01348	0.0061	24.6
250	1.015	1.013	21	12.9	0.01348	0.0031	21.3
1440	1.011	1.009	21	13.9	0.01348	0.0013	14.7
4140	1.010	1.008	21	14.2	0.01348	0.0008	13.1



GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

—■— SS14

Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	CA HSR FRE_BAK
SS14	(SM) Silty Sand	0	57.5	30.7	11.8	1.8					
										TES#:	23502-ZS9
										Boring#:	S0069R
										Date:	10/16/2013

* Particles smaller than 5 Micron in diameter

Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	10/3/2013
TES#:	23502-ZS9	Sample No.:	MC15-2
Boring #:	S0069R; 70.5-71.0'	Classification:	(SM) Silty Sand

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	334.4	1/2"	4.0 (2.0)
Initial Weight Fine Aggregate Before Wash	334.4	3/4"	11.0 (5.0)
		1"	22.0 (10.0)
Final Weight Fine Aggregate After Wash	271.4	1 1/2"	33.0 (15.0)
		2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	1.2	1.2	0.4	99.6	
#16	9.5	8.3	2.8	97.2	
#30	35.0	25.5	10.5	89.5	
#50	127.8	92.8	38.2	61.8	
#100	209.4	81.6	62.6	37.4	
#200	262.7	53.3	78.6	21.4	
Pan	271.4				



*Construction Testing & Inspection * Geotechnical & Environmental Engineering*

Sieve Analysis for Soil and Fine Aggregate

Project:	CA HSR FRE_BAK	Technician:	K. Ford
TES#:	23502-ZS9	Date:	10/16/2013
Boring No.:	S0069R	Sample No.:	SS18
		Remarks:	(SM/ML) Sandy Silt

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	74.0	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	74.0	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	38.3	2"	44.0 (20.0)

Sieve Size	Individual Weight Retained	Individual % Retained	Combined % Retained	Combined % Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.1	0.1	0.1	99.9	
#10	0.1	0.1	0.3	99.7	
#16	0.2	0.3	0.5	97.8	
#30	5.2	7.0	7.6	92.4	
#40	3.9	5.3	12.8	87.2	
#50	6.8	9.2	22.0	78.0	
#100	9.5	12.8	34.9	65.2	
#200	10.0	13.5	48.4	51.7	
Pan					

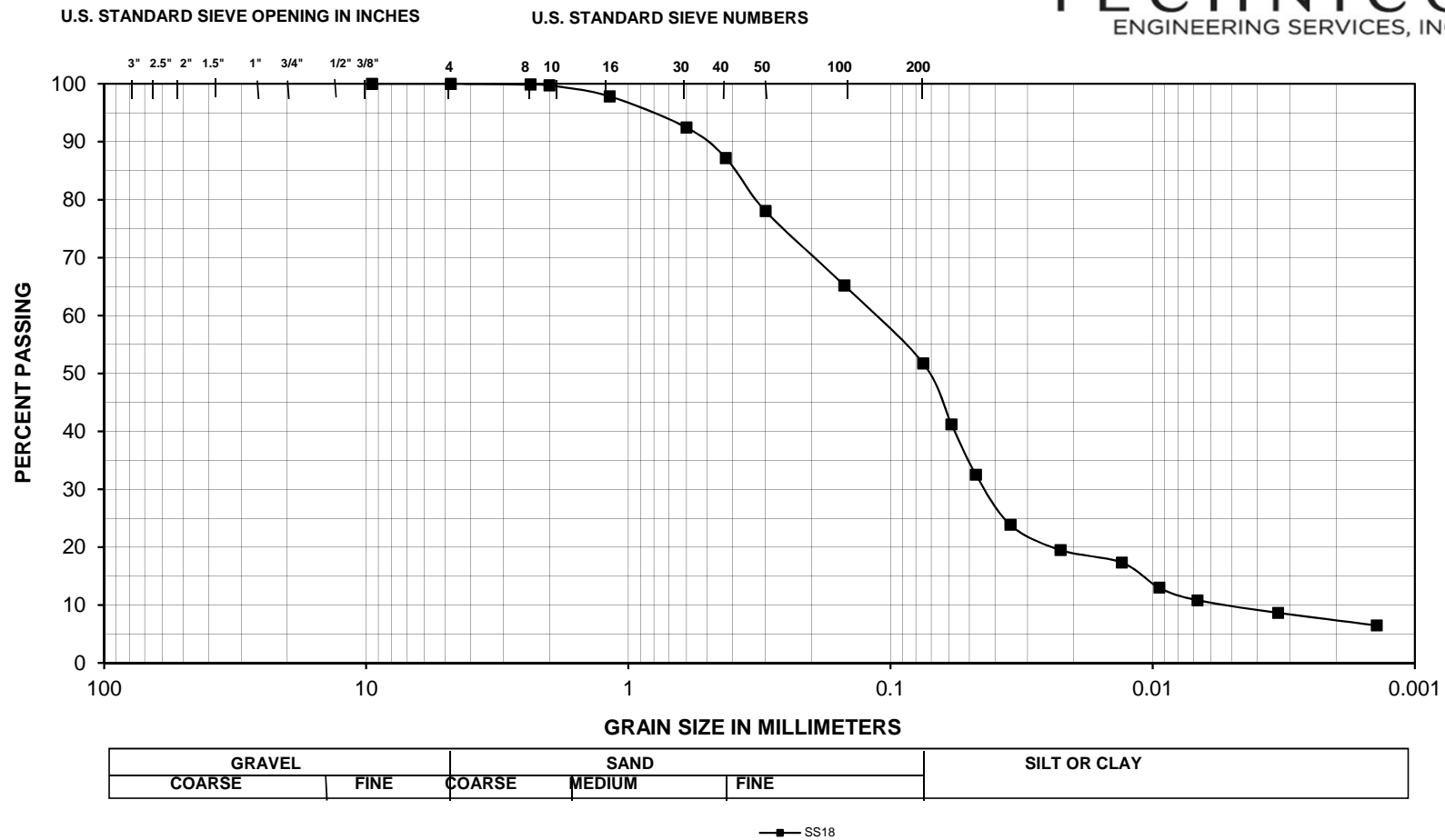


Construction Testing & Inspection * Geotechnical & Environmental Engineering

HYDROMETER TEST DATA SUMMARY

ASTM D 422-63

PROJECT:		CA HSR FRE_BAK				TES #: 23502-ZS9	
Boring Number		S0069R				DATE: 10/16/2013	
Sample Depth, ft		86.0'-86.5'		Sample No.: SS18		TESTED BY: K. Ford	
Mass of Test Sample, g		75.00		"air-dried"		Hydrometer Type 151H	
Mass of Hygroscopic Sample, g		8.67		"air-dried"			
Mass of Hygroscopic Sample, g		8.55		"oven-dried"		Specific Gravity of Test Material 2.650	
Mass of Test Sample, g		73.96		"oven-dried"		Specific Gravity of Test Solution Varies	
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)
0.6	1.021	1.019	21	11.3	0.01348	0.0585	41.3
1	1.017	1.015	21	12.3	0.01348	0.0473	32.6
2	1.013	1.011	21	13.4	0.01348	0.0349	23.9
5	1.011	1.009	21	13.9	0.01348	0.0225	19.6
15	1.010	1.008	21	14.2	0.01348	0.0131	17.4
30	1.008	1.006	21	14.7	0.01348	0.0094	13.0
60	1.007	1.005	21	15.0	0.01348	0.0067	10.9
250	1.006	1.004	21	15.2	0.01348	0.0033	8.7
1440	1.005	1.003	21	15.5	0.01348	0.0014	6.5
4140	1.005	1.003	21	15.5	0.01348	0.0008	6.5



Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	CA HSR FRE_BAK
SS18	(SM/ML) Sandy Silt	0	48.4	39.8	11.8	1.4					
										TES#:	23502-ZS9
										Boring#:	S0069R
										Date:	10/16/2013

* Particles smaller than 5 Micron in diameter

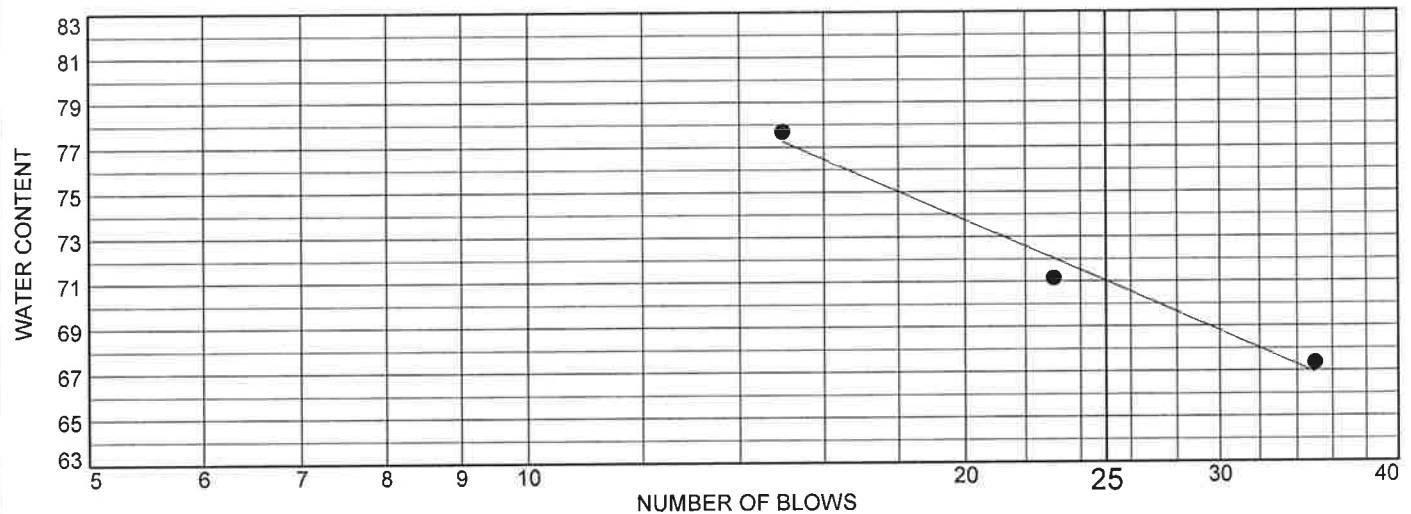
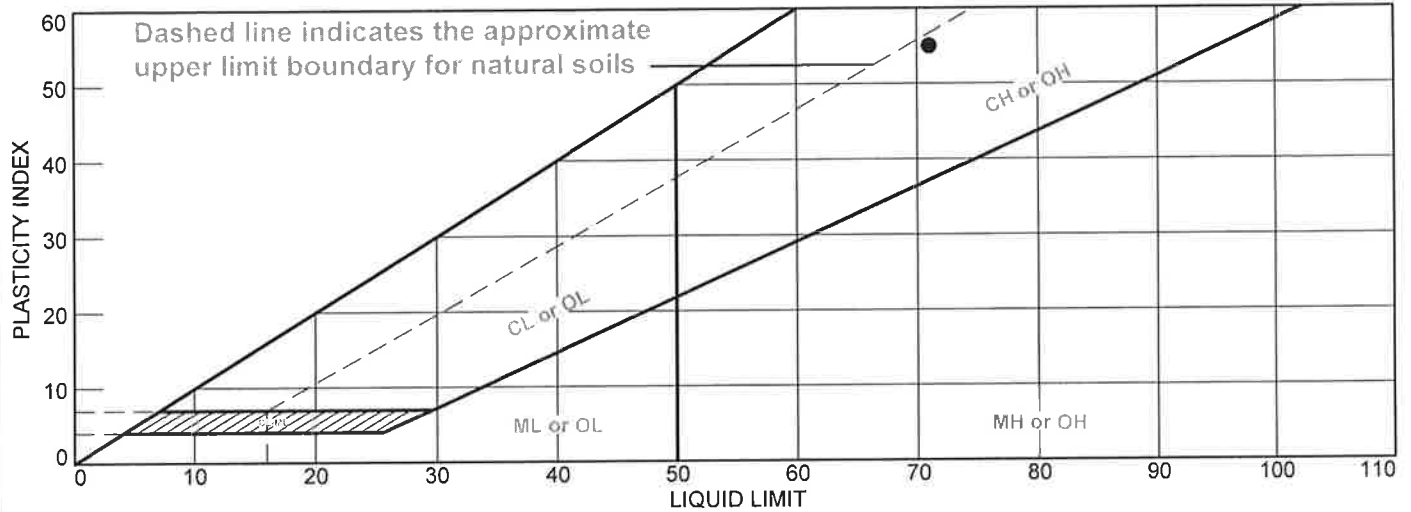
Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	10/3/2013
TES#:	23502-ZS9	Sample No.:	SS20
Boring #:	S0069R; 96.0-96.5'	Classification:	(SM) Silty Sand

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	255.1	1/2"	4.0 (2.0)
Initial Weight Fine Aggregate Before Wash	255.1	3/4"	11.0 (5.0)
Final Weight Fine Aggregate After Wash	209.6	1"	22.0 (10.0)
		1 1/2"	33.0 (15.0)
		2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	1.0	1.0	0.4	99.6	
#16	9.9	8.9	3.9	96.1	
#30	41.9	32.0	16.4	83.6	
#50	99.4	57.5	39.0	61.0	
#100	157.4	58.0	61.7	38.3	
#200	204.8	47.4	80.3	19.7	
Pan	209.6				

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish green clay with sand	71	16	55			

Project No. 2636-001.0 Client: URS/ARUP/HMM JV

Project: California High Speed Train

● Source: S0069R G-52923

Depth: 5.5-6.0

Sample No.: MC02-2

Remarks:



Figure

Tested By: JH

Checked By: PH



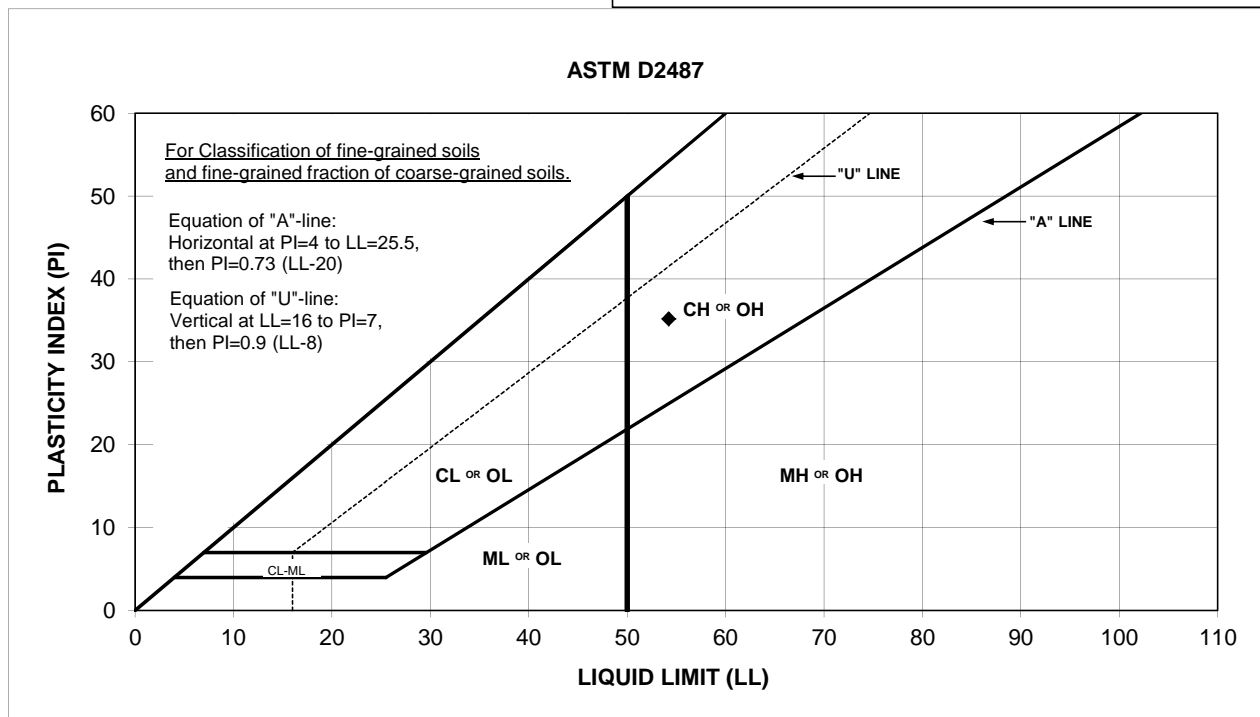
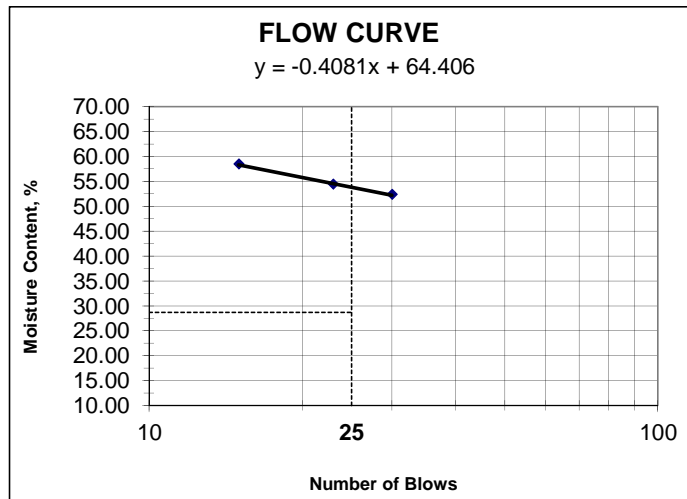
Determination of Atterberg Limits ASTM D 4318, CTM 204

Project Name:	HSR	Project No.:	23502-ZS9
Soil Boring No.:	S0069R	Depth:	6.5'-7.0'
Date:	10/14/13	Tested By:	S. Alvarez
Sample No.:	U03	Classification:	(CH) Fat clay

	PLASTIC LIMIT		
	1	2	3
A Tes No.			
B Tare No.			
C Mass of Pan + Dry Soil, g	23.94	30.30	30.74
D Mass of Pan + Wet Soil, g	24.55	30.67	31.23
E Mass of Pan, g	20.53	28.34	28.32
F Mass of Water, g	0.61	0.37	0.49
G Mass of Dry Soil, g	3.41	1.96	2.42
H Moisture Content, %	17.89	18.88	20.25
I Average Moisture Content, % (PL)		19.00	

	LIQUID LIMIT		
	30	23	15
No. of Blows			
	26.71	34.83	35.79
	29.71	38.23	40.18
	20.99	28.59	28.29
	3.00	3.40	4.39
	5.72	6.24	7.50
	52.45	54.49	58.53

Liquid Limit:	54.2
Plastic Limit: Line I	19.0
Plasticity Index: PI = LL - PL	35.2





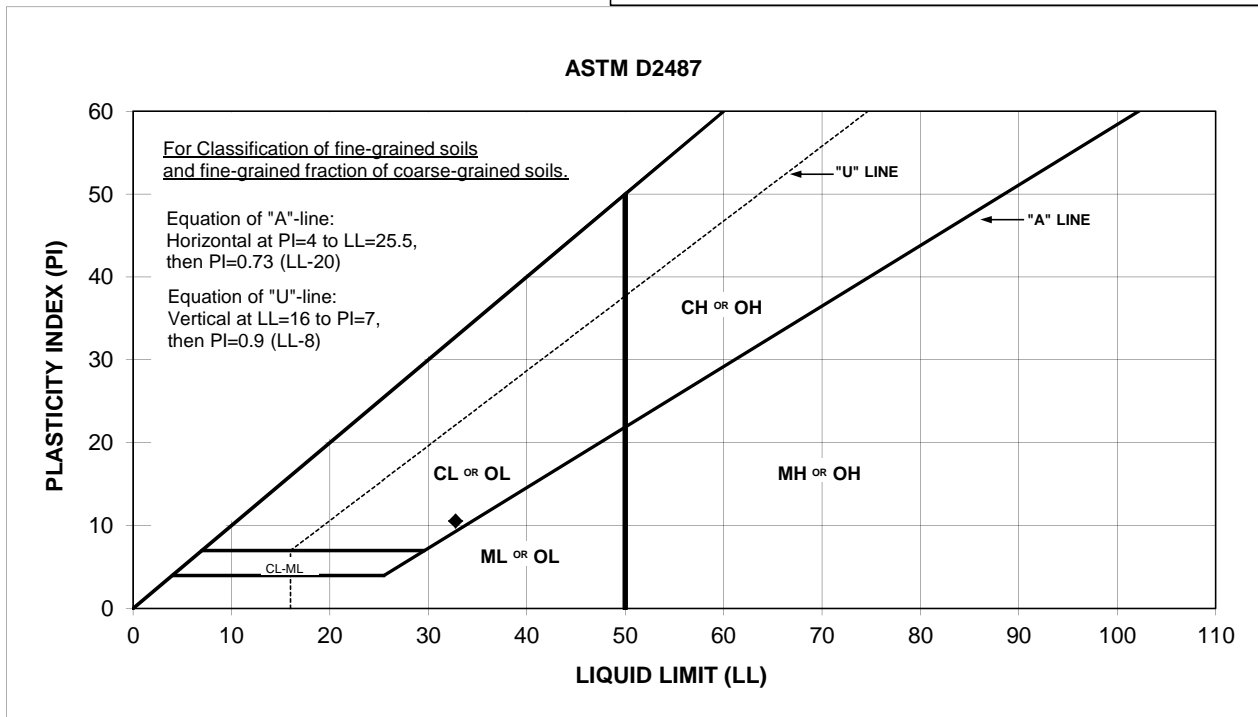
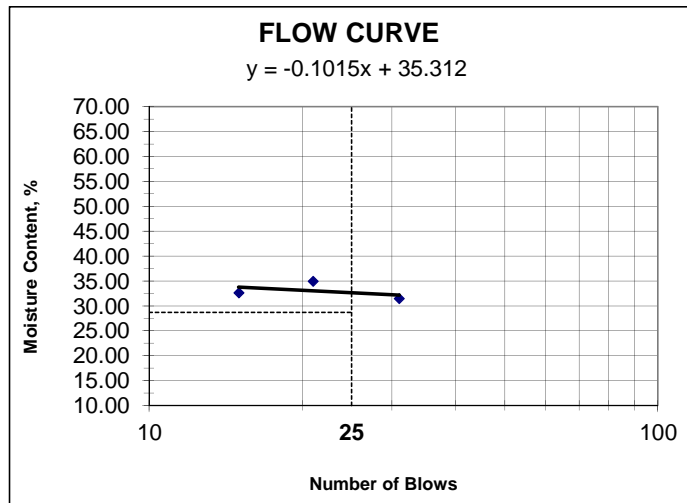
Determination of Atterberg Limits ASTM D 4318, CTM 204

Project Name:	HSR			Project No.:	23502-ZS9		
Soil Boring No:	S0069R	Depth:	15.5'-16.0'	Date:	10/8/13	Tested By:	K.Ford
Sample No.:	MC04-2			Classification:	(CL) Sandy Clay		

	PLASTIC LIMIT		
	1	2	3
A Tes No.			
B Tare No.			
C Mass of Pan + Dry Soil, g	31.75	30.35	29.93
D Mass of Pan + Wet Soil, g	32.49	30.81	30.38
E Mass of Pan, g	28.35	28.19	28.02
F Mass of Water, g	0.74	0.46	0.45
G Mass of Dry Soil, g	3.40	2.16	1.91
H Moisture Content, %	21.76	21.30	23.56
I Average Moisture Content, % (PL)		22.21	

	LIQUID LIMIT		
	31	21	15
No. of Blows			
	30.85	32.62	33.96
	31.65	33.98	35.78
	28.31	28.73	28.39
	0.80	1.36	1.82
	2.54	3.89	5.57
	31.50	34.96	32.68

Liquid Limit:	32.8
Plastic Limit: Line I	22.2
Plasticity Index: PI = LL - PL	10.6





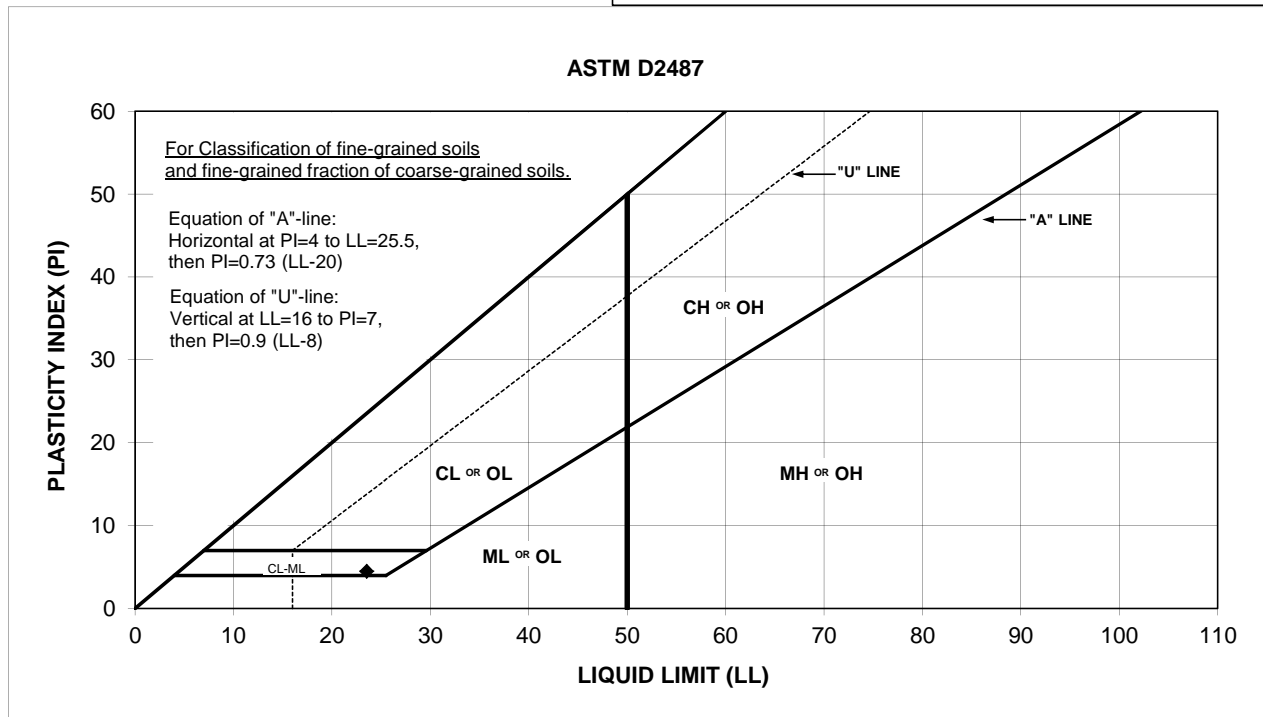
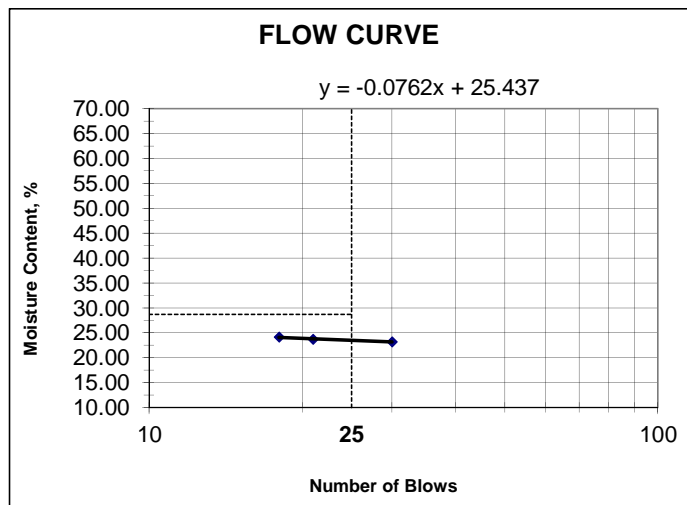
Determination of Atterberg Limits
ASTM D 4318, CTM 204

Project Name:	HSR				Project No.:	23502-ZS9	
Soil Boring No:	S0069R	Depth:	24.0'-24.5'	Date:	10/18/13	Tested By:	K. Ford
Sample No.:	U06				Classification:	(CL) Clayey Silt	

	PLASTIC LIMIT		
	1	2	3
A Tes No.			
B Tare No.			
C Mass of Pan + Dry Soil, g	30.72	29.79	30.52
D Mass of Pan + Wet Soil, g	31.18	30.09	30.99
E Mass of Pan, g	28.34	28.21	28.01
F Mass of Water, g	0.46	0.30	0.47
G Mass of Dry Soil, g	2.38	1.58	2.51
H Moisture Content, %	19.33	18.99	18.73
I Average Moisture Content, % (PL)		19.01	

	LIQUID LIMIT		
	18	21	30
No. of Blows			
	35.29	33.46	35.54
	36.98	34.68	37.13
	28.29	28.32	28.68
	1.69	1.22	1.59
	7.00	5.14	6.86
	24.14	23.74	23.18

Liquid Limit:	23.5
Plastic Limit: Line I	19.0
Plasticity Index: PI = LL - PL	4.5





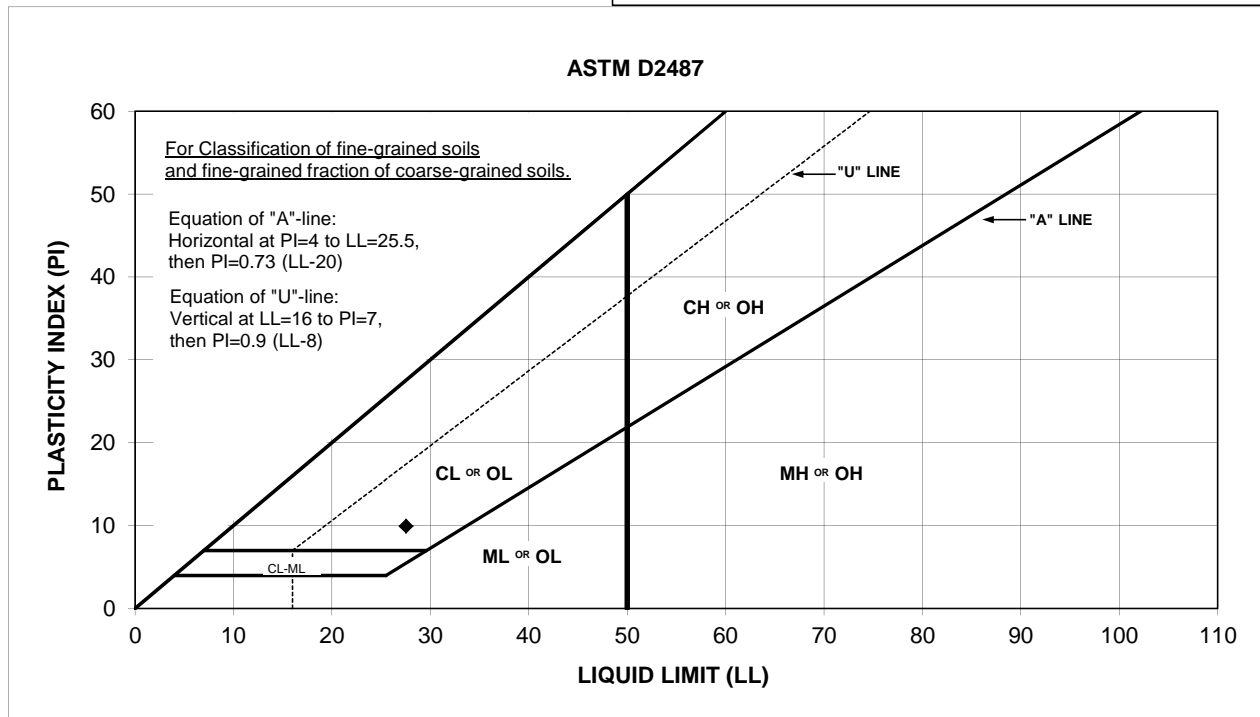
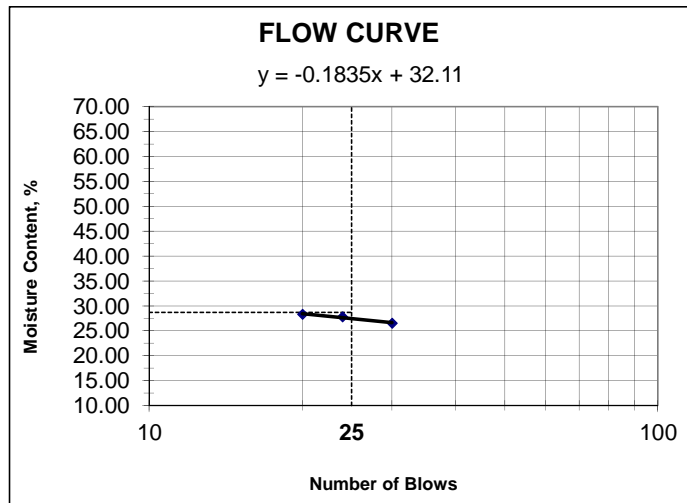
Determination of Atterberg Limits ASTM D 4318, CTM 204

Project Name:	HSR	Project No.:	23502-ZS9
Soil Boring No:	S0069R	Depth:	50.5'-51'
Date:	10/14/13	Tested By:	S. Alvarez
Sample No.:	MC11-2	Classification:	(CL) Sandy Clay

	PLASTIC LIMIT		
	1	2	3
A Tes No.			
B Tare No.			
C Mass of Pan + Dry Soil, g	31.57	32.63	32.23
D Mass of Pan + Wet Soil, g	32.14	33.35	32.98
E Mass of Pan, g	28.23	28.40	28.20
F Mass of Water, g	0.57	0.72	0.75
G Mass of Dry Soil, g	3.34	4.23	4.03
H Moisture Content, %	17.07	17.02	18.61
I Average Moisture Content, % (PL)		17.57	

	LIQUID LIMIT		
	30	24	20
No. of Blows			
	31.50	32.09	29.50
	34.35	35.25	31.96
	20.77	20.73	20.83
	2.85	3.16	2.46
	10.73	11.36	8.67
	26.56	27.82	28.37

Liquid Limit:	27.5
Plastic Limit: Line I	17.6
Plasticity Index: PI = LL - PL	10.0





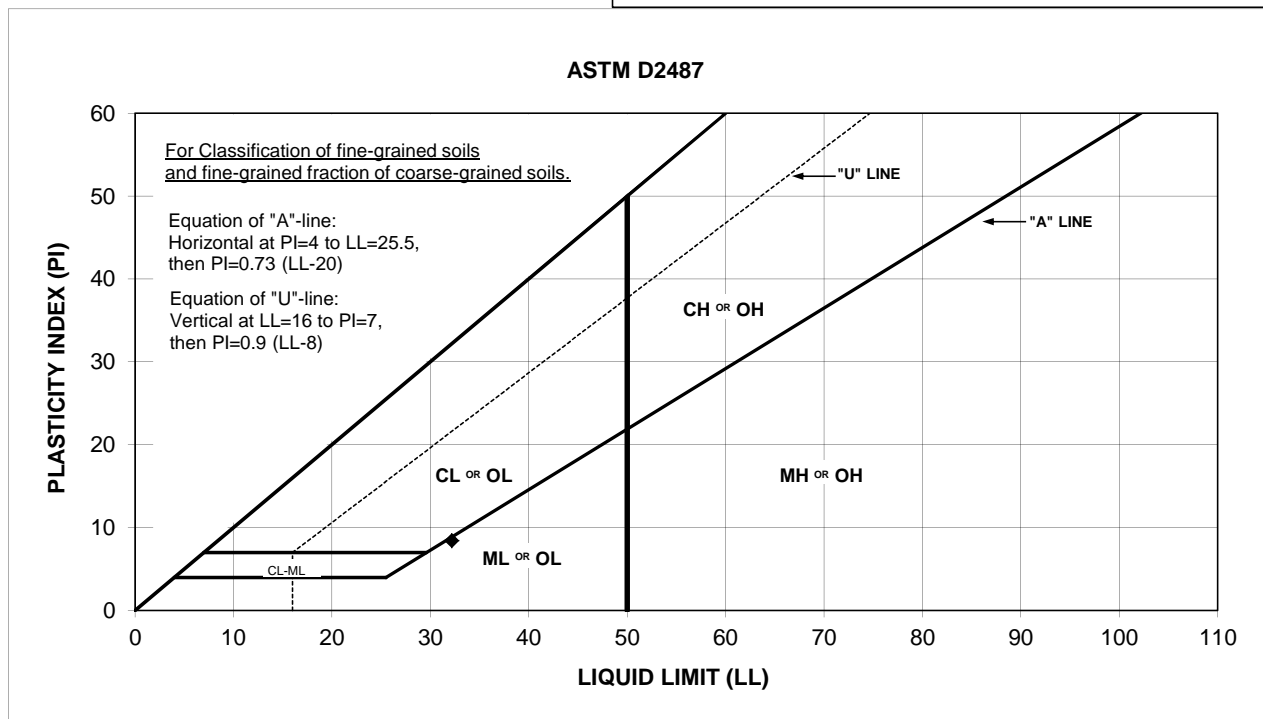
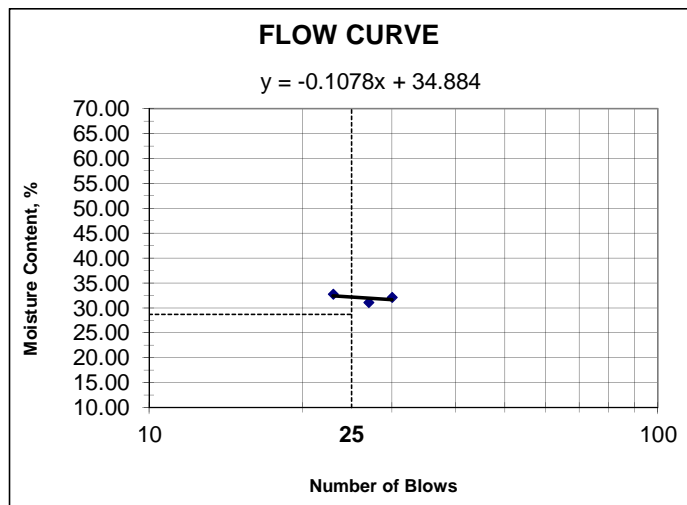
Determination of Atterberg Limits ASTM D 4318, CTM 204

Project Name:	HSR	Project No.:	23502-ZS9
Soil Boring No:	S0069R	Depth:	56.0'-56.5'
Date:	10/11/13	Tested By:	K. Ford
Sample No.:	SS12	Classification:	(ML) Clayey Silt

	PLASTIC LIMIT		
	1	2	3
A Tes No.			
B Tare No.			
C Mass of Pan + Dry Soil, g	30.96	29.80	29.16
D Mass of Pan + Wet Soil, g	31.56	30.17	29.45
E Mass of Pan, g	28.32	28.21	28.01
F Mass of Water, g	0.60	0.37	0.29
G Mass of Dry Soil, g	2.64	1.59	1.15
H Moisture Content, %	22.73	23.27	25.22
I Average Moisture Content, % (PL)		23.74	

	LIQUID LIMIT		
	23	27	30
No. of Blows			
	31.78	36.34	33.58
	32.93	38.84	35.18
	28.27	28.31	28.60
	1.15	2.50	1.60
	3.51	8.03	4.98
	32.76	31.13	32.13

Liquid Limit:	32.2
Plastic Limit: Line I	23.7
Plasticity Index: PI = LL - PL	8.4




TECHNICON
 ENGINEERING SERVICES, INC.
Unconsolidated-Undrained Triaxial Compression on Cohesive Soils
ASTM D2850

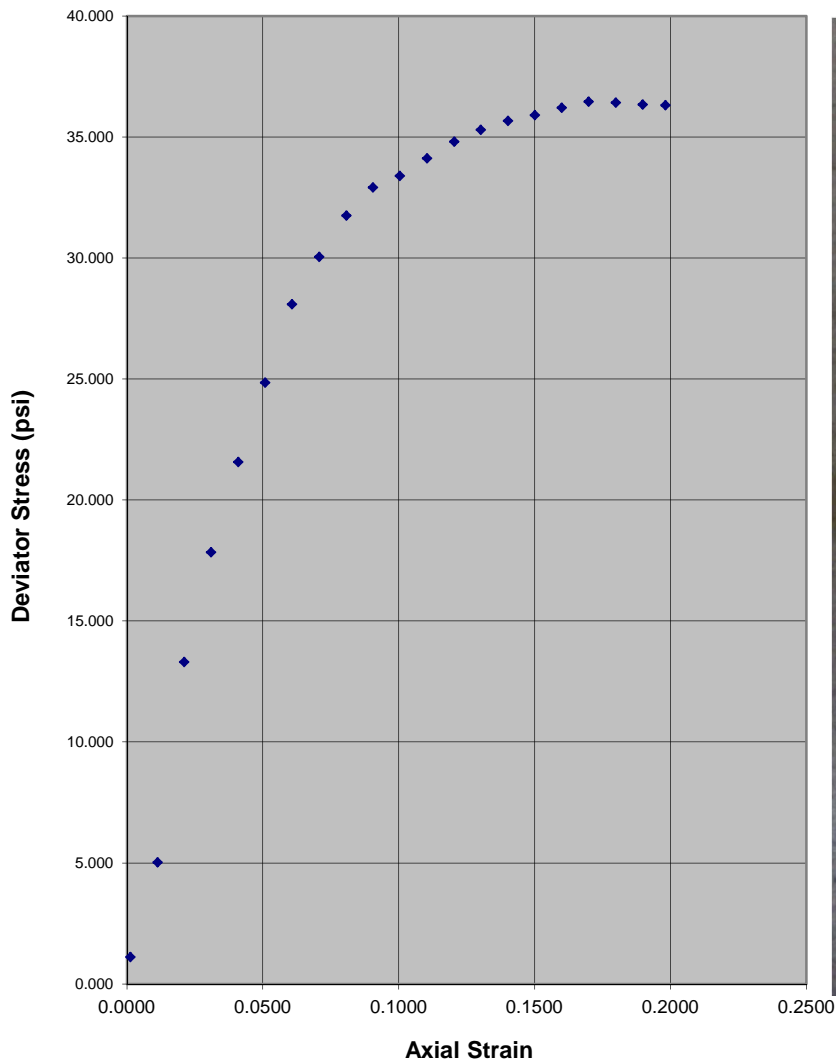
PROJECT CA HST
 BORING # S0069R; MC-2-1 Depth (ft) 6
 DESCRIPTION (CL) Sandy Clay

TES # 23502-ZS9
 Test Date 11/7/2013
 Tested By D. Carruba

Sample and Test Parameters

Wt. Specimen Wet + Tare (gm)	<u>750.7</u>	Water Content %	<u>20.7</u>	Diameter, D ₀ , (in)	<u>2.41</u>
Wt. Specimen Dry + Tare (gm)	<u>622.1</u>	Wt. Tare (gm)	<u>0</u>	Area, A ₀ , (in ²)	<u>4.56</u>
Wt. Water (gm)	<u>128.6</u>	Unit Wt. Wet (pcf)	<u>123.4</u>	Height, H ₀ , (in)	<u>5.08</u>
Wt. Specimen Dry (gm)	<u>622.1</u>	Unit Wt. Dry (pcf)	<u>102.3</u>	Volume, V ₀ , (in ³)	<u>23.17</u>
Rate, in/min	<u>0.05</u>	Rate, %/min	<u>1.00</u>	Saturation, %*	<u>86.2</u>
Cell Pressure, psi	<u>10</u>	Strain, %	<u>16.99%</u>	Deviator Stress, psi	<u>36.45</u>

*S.G. assumed 2.70




TECHNICON
 ENGINEERING SERVICES, INC.
Unconsolidated-Undrained Triaxial Compression on Cohesive Soils
ASTM D2850

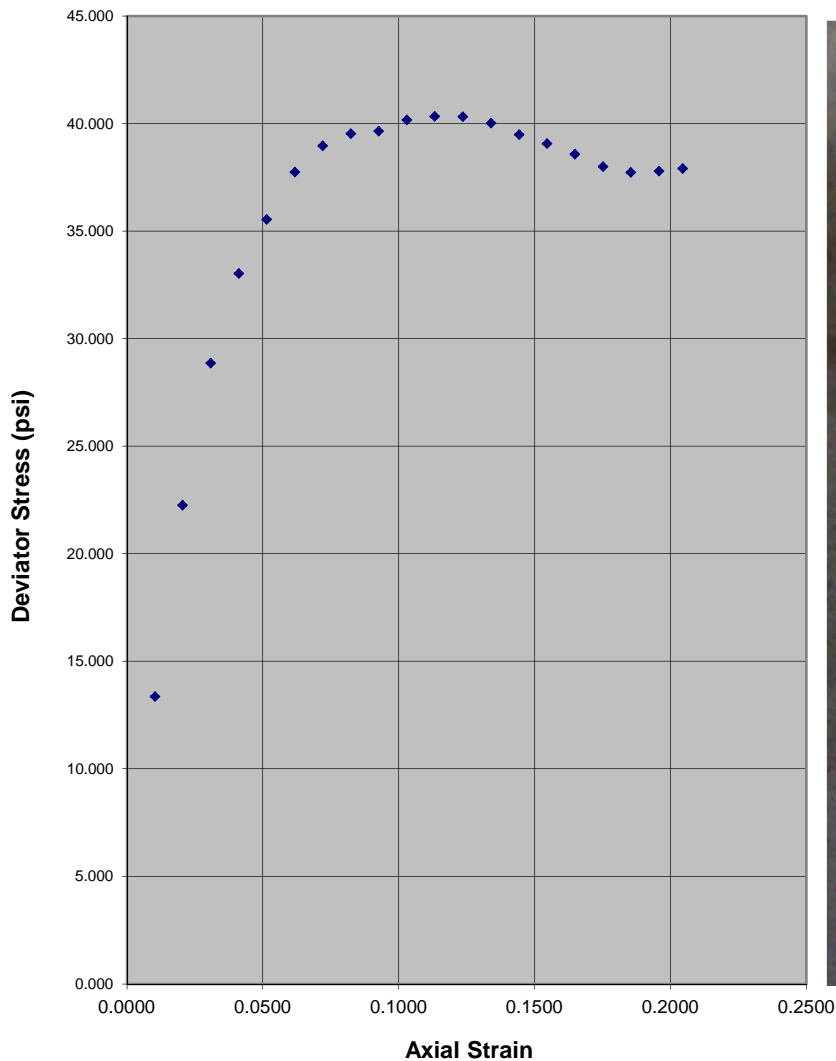
PROJECT CA HST
 BORING # S0069R; MC-4-1 Depth (ft) 16
 DESCRIPTION (CL) Sandy Clay

TES # 23502-ZS9
 Test Date 11/7/2013
 Tested By D. Carruba

Sample and Test Parameters

Wt. Specimen Wet + Tare (gm)	<u>771.9</u>	Water Content %	<u>19.1</u>	Diameter, D ₀ , (in)	<u>2.43</u>
Wt. Specimen Dry + Tare (gm)	<u>648.1</u>	Wt. Tare (gm)	<u>0</u>	Area, A ₀ , (in ²)	<u>4.64</u>
Wt. Water (gm)	<u>123.8</u>	Unit Wt. Wet (pcf)	<u>129.7</u>	Height, H ₀ , (in)	<u>4.89</u>
Wt. Specimen Dry (gm)	<u>648.1</u>	Unit Wt. Dry (pcf)	<u>108.9</u>	Volume, V ₀ , (in ³)	<u>22.68</u>
Rate, in/min	<u>0.05</u>	Rate, %/min	<u>1.00</u>	Saturation, %*	<u>94.2</u>
Cell Pressure, psi	<u>20</u>	Strain, %	<u>11.33%</u>	Deviator Stress, psi	<u>40.34</u>

*S.G. assumed 2.70




TECHNICON
 ENGINEERING SERVICES, INC.
Unconsolidated-Undrained Triaxial Compression on Cohesive Soils
ASTM D2850

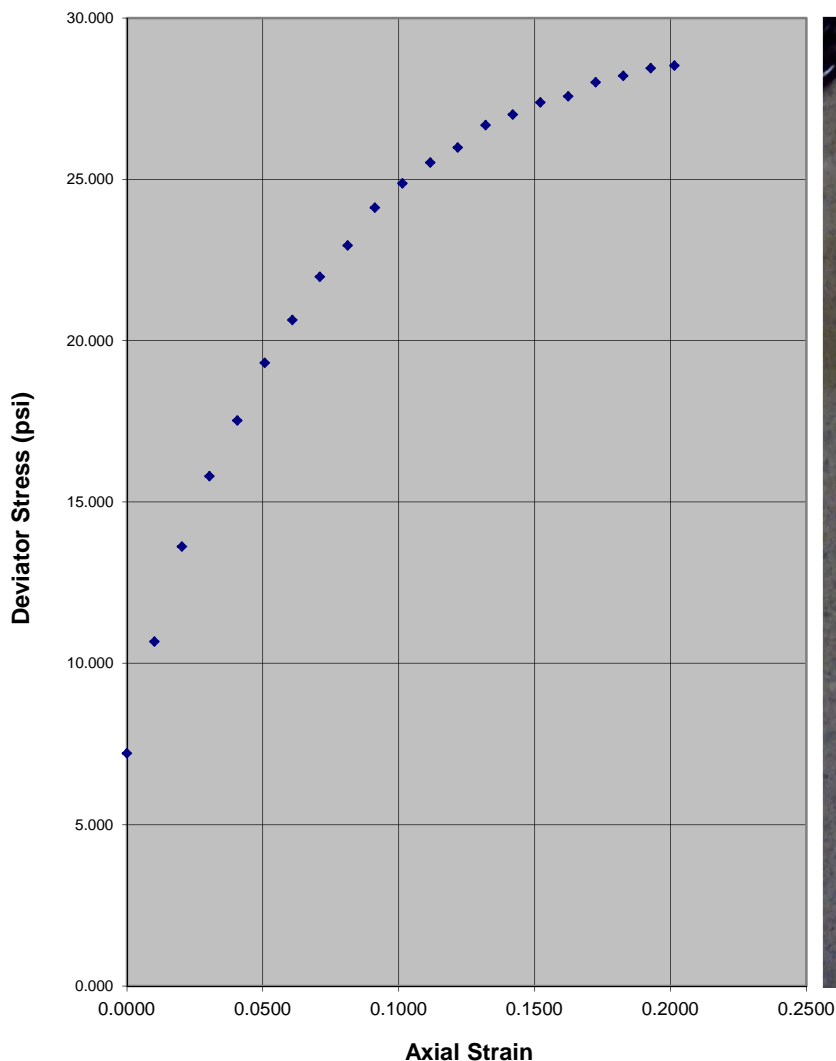
PROJECT CA HST
 BORING # S0069R; MC11-1 Depth (ft) 51
 DESCRIPTION (CL) Sandy Clay

TES # 23502-ZS9
 Test Date 11/7/2013
 Tested By D. Carruba

Sample and Test Parameters

Wt. Specimen Wet + Tare (gm)	<u>790.6</u>	Water Content %	<u>19.4</u>	Diameter, D ₀ , (in)	<u>2.42</u>
Wt. Specimen Dry + Tare (gm)	<u>662.0</u>	Wt. Tare (gm)	<u>0</u>	Area, A ₀ , (in ²)	<u>4.60</u>
Wt. Water (gm)	<u>128.6</u>	Unit Wt. Wet (pcf)	<u>131.8</u>	Height, H ₀ , (in)	<u>4.97</u>
Wt. Specimen Dry (gm)	<u>662</u>	Unit Wt. Dry (pcf)	<u>110.3</u>	Volume, V ₀ , (in ³)	<u>22.86</u>
Rate, in/min	<u>0.05</u>	Rate, %/min	<u>1.00</u>	Saturation, %*	<u>99.5</u>
Cell Pressure, psi	<u>55</u>	Strain, %	<u>20.14%</u>	Deviator Stress, psi	<u>28.53</u>

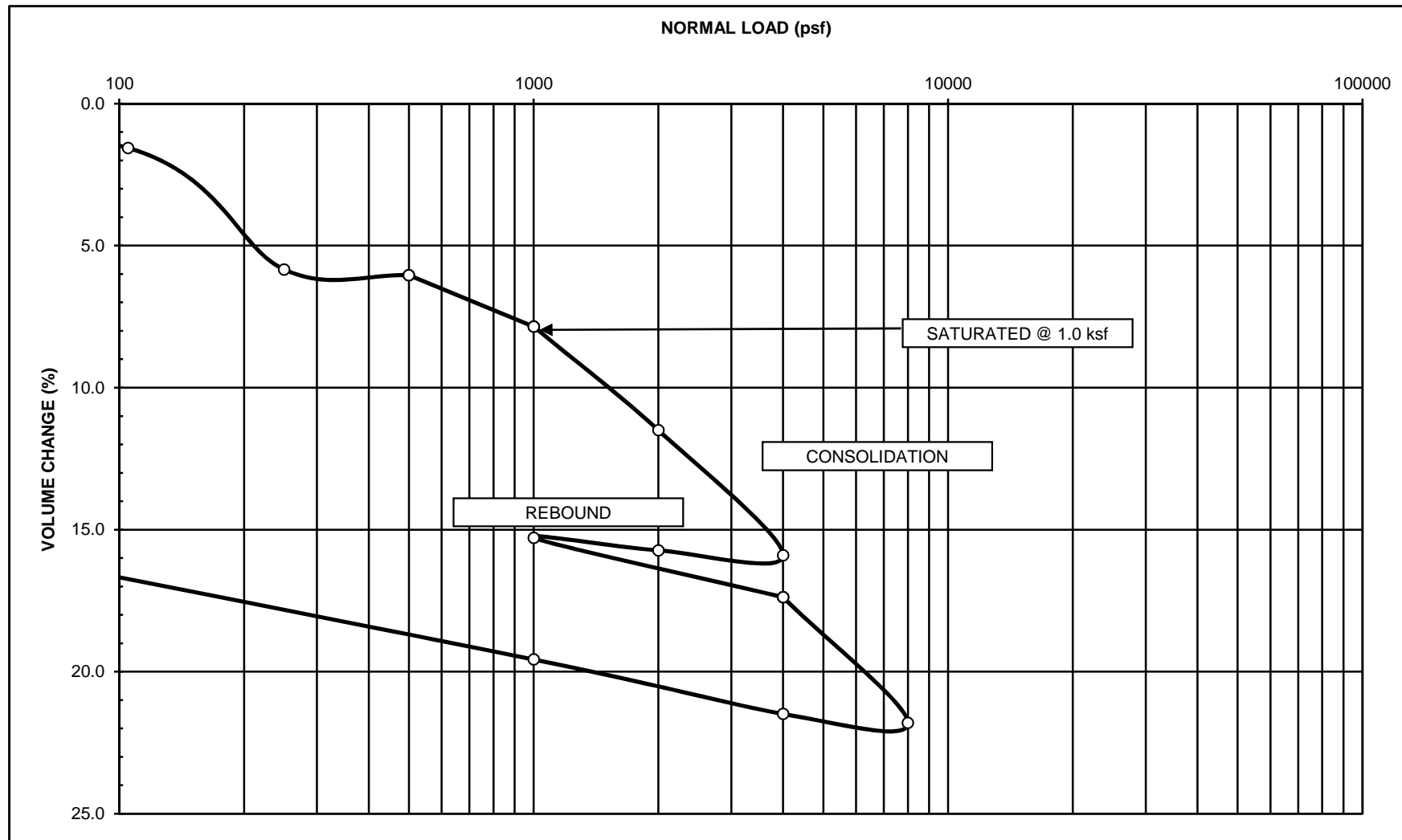
*S.G. assumed 2.70





Construction Testing & Inspection * Geotechnical & Environmental Engineering

CONSOLIDATION TEST DATA



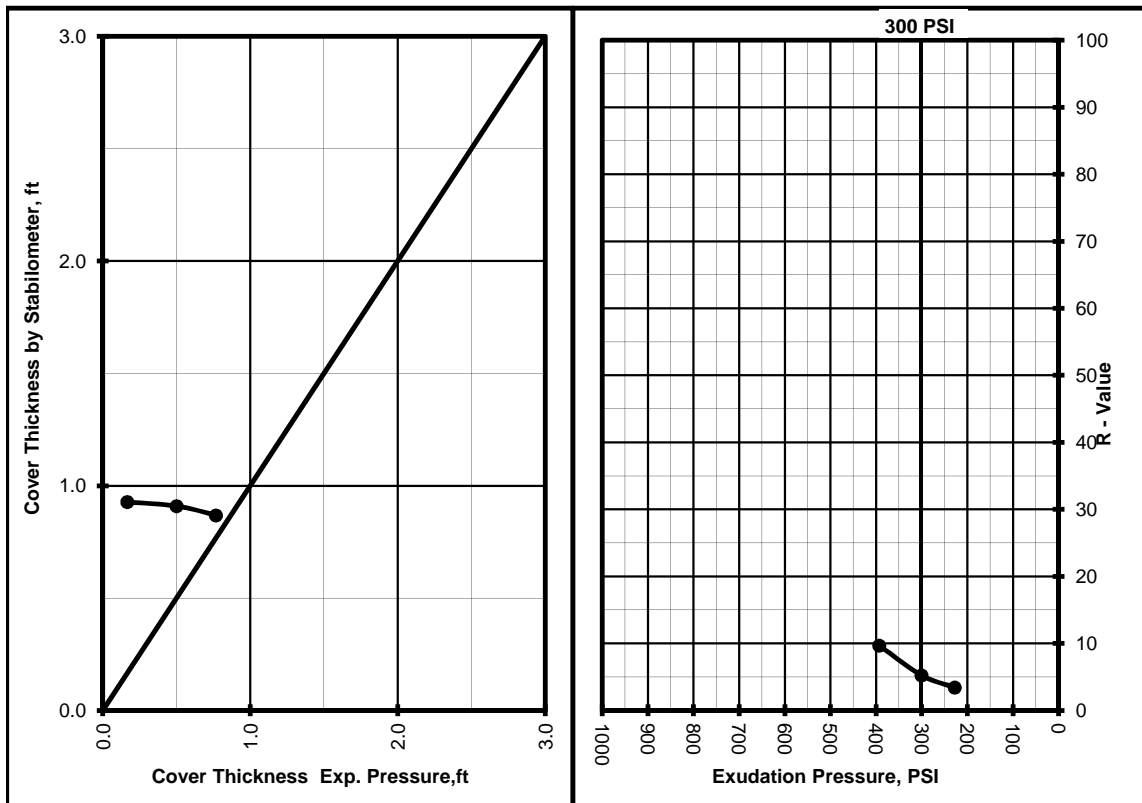
BORING NO.	DEPTH (ft)	SAMPLE DESCRIPTION	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PROJECT:	HSR
					PROJECT NO.:	23502-ZS9
U03	7-7.5'	CLAY (CL) Saturated @ 1 ksf.	36.1	84.9	TEST DATE:	10/11/2013
			FINAL	FINAL	TESTED BY:	K.Ford
			30.0	100.2	CONDITION:	Undisturbed


TECHNICON
 ENGINEERING SERVICES, INC.
R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number : 23502-ZS9
 Project Name : CA HSR FRE_BAK
 Date : 10/26/13
 Sample Location/Curve Number : Boring S0069R,B-1 @ 0-5'
 Soil Classification : SC

TEST	A	B	C
Percent Moisture @ Compaction, %	14.6	15.8	16.9
Dry Density, lbm/cu.ft.	115.7	112.8	110.5
Exudation Pressure, psi	393	300	227
Expansion Pressure, (Dial Reading)	0.0023	0.0015	0.0005
Expansion Pressure, psf	0.009959	0.006495	0.002165
Resistance Value R	10	5	3

R Value at 300 PSI Exudation Pressure	5
R Value by Expansion Pressure (TI =): 5	6




TECHNICON
 ENGINEERING SERVICES, INC.
Laboratory Compaction Curve
ASTM D - 1557

Project Number : 23502-ZS9
 Project Name : CA HSR FRE_BAK
 Date : 10/15/2013
 Sample location : S0069R
 Sample/Curve Number : B01 0-5'
 Soil Classification : (SC) Sandy Clay
 Test Method : 1557C

	1	2	3	4
Weight of Moist Specimen & Mold, gm	7553.5	7561.1	7450.7	
Weight of Compaction Mold, gm	2857.1	2857.1	2857.1	
Weight of Moist Specimen, gm	4696.4	4704.0	4593.6	
Volume of mold, cu. ft.	0.0750	0.0750	0.0750	
Wet Density, lbs/cu.ft.	138.0	138.3	135.0	
Weight of Wet (Moisture) Sample, gm	200.0	200.0	200.0	
Weight of Dry (Moisture) Sample, gm	182.4	179.9	185.1	
Moisture Content, %	9.6	11.2	8.0	
Dry Density, lbs/cu.ft.	125.9	124.4	125.0	

